

Teaching Suggestions: Geology Activity #2

Monster Rock!

Background Information:

Over time, lichens and mosses colonize rocks. Decomposing crustose lichens on rocks release carbon dioxide, which reacts with water to produce weak carbonic acid. This acid breaks down minerals in the rock. This process, called chemical weathering, produces small pits in flat granite where organic debris and water can build up.

The root hairs of mosses and roots of plants penetrate into cracks in the rock and help break up rock. This is a type of mechanical weathering.

Organic debris from trees and plants decomposes and adds to weathered rock particles to form soil. As the soil layer thickens, seeds can germinate and trees and other plants take root.

Lichen and moss grow very slowly. One four-inch section of lichen on a granite boulder in Yosemite Valley is known to be over 100 years old — a good reason to treat lichen with respect. Large amounts of lichen and moss indicate that a rock has been in one spot for a long time.

When rockfalls occur, loose piles of angular rocks (talus) come to rest at the base of a cliff. Old talus is a great place to look for boulders that have plant life and lichen attached.

Concepts:

Rocks that have been in the same spot for a long time often have lichen, moss, and other plant growth on them. Lichen, moss and plants can promote weathering of rocks.

Vocabulary:

decompose, lichen, moss, talus, chemical weathering, mechanical weathering, carbon dioxide

If You are Taking the Virtual Hike

This online activity consists of two questions about weathering. After students closely examine Monster Rock, they should explore the rock in the first few screens by moving the mouse over the photographs to find clues. Students have two tries to answer correctly. The program presents immediate feedback to the answers and suggests a hint after an incorrect answer.

If You are Visiting the Park and Hiking the Trail

Materials:

- hand lenses (1 per student or 1 per pair of students)
- one water bottle squirter

Look near a cliff for a large talus boulder that has been in place for some time (obvious signs are a lot of lichen and plant growth such as small bushes or trees on the rock).

Site:

Monster Rock site #2 on the Mirror Lake Trail Map. If you can't find the exact rock, any large moss- or plant-covered boulder will work.

Time:

10-15 minutes

Activity:

This activity can be done individually or in pairs. Ask the students to examine the rock with hand lenses. They should investigate Monster Rock for clues and come up with hypotheses about how long Monster Rock has been in the same spot. They must support their hypotheses with the clues that they find.

Demonstrate the use of the hand lenses. Point out lichen and moss on the rock. Squirt the moss and lichen with water so that students can see the moss react quickly to water by puffing up and turning a brighter green.

Resource Message:

While looking for evidence, don't pick, kick, or scrape off the moss and lichen. Give them clues before they start investigating.

- How long do they think this rock has been here in the same spot?
- Where did it come from?
- Is there anything growing on it that gives you clues?

Have them look for evidence individually without discussing their hypotheses with each other. After a while, ask for their observations and make sure they support their ideas with evidence. Support their observations by telling them how long lichen takes to grow. A four-inch square patch of lichen on a boulder in Yosemite Valley is known to be 100 years old.

Teaching hint: Set boundaries at the beginning of this activity and point out specific boulders that students can examine. Demonstrate how to examine the boulders with a hand lens.